

IN THE CLAIMS:

The following is a complete listing of the claims in this application, reflects all changes currently being made to the claims, and replaces all earlier versions and all earlier listings of the claims:

Claim 1. (Currently Amended) A photoelectric conversion device comprising:

a plurality of photoelectric conversion regions each having a first semiconductor region for accumulating electric charges that correspond to incident light; and

a plurality of ~~[[an]]~~ amplifying ~~field~~ field effect transistors into which a signal charge from ~~[[the]]~~ said photoelectric conversion regions is inputted, wherein:

each ~~[[the]]~~ photoelectric conversion region is surrounded by a potential barrier region~~[[;]]~~.

a nick region is formed in a part of ~~[[the]]~~ said potential barrier region~~[[;]]~~, and

one of main electrode regions of ~~[[the]]~~ each field effect transistor is placed adjacent to ~~[[the]]~~ said nick region, ~~[[the]]~~ said main electrode region having the same conductivity type as ~~[[the]]~~ said first semiconductor region ~~photoelectric conversion region~~.

Claim 2. (Currently Amended) A photoelectric conversion device according to claim 1, wherein ~~[[the]]~~ said potential barrier region includes at least a selectively oxidized film and a channel stopping layer directly below ~~[[the]]~~ said selectively oxidized film.

Claim 3. (Currently Amended) A photoelectric conversion device according to

claim 1, wherein [[the]] said potential barrier region includes at least a buried isolation region whose conductivity type is opposite to that of [[the]] said photoelectric conversion regions.

Claim 4. (Currently Amended) A photoelectric conversion device according to claim 1, wherein [[the]] each photoelectric conversion region is formed in a low impurity concentration region that is doped with an impurity of the same conductivity type as [[the]] said photoelectric conversion regions in a concentration lower than the impurity concentration of [[the]] said photoelectric conversion regions.

Claim 5. (Currently Amended) A photoelectric conversion device according to claim 4, wherein a buried isolation region whose conductivity type is opposite to the conductivity type of [[the]] said photoelectric conversion regions is formed below [[the]] each field effect transistor.

Claim 6. (Currently Amended) A photoelectric conversion device according to claim 5,

wherein [[the]] said buried isolation region placed below [[the]] each field effect transistor surrounds a region larger than [[the]] each photoelectric conversion region, and

wherein the region surrounded by the buried isolation region functions as a photosensitive region.

Claim 7. (Currently Amended) A photoelectric conversion device according to

claim 1, wherein an impurity diffusion region whose conductivity type is opposite to the conductivity type of [[the]] said photoelectric conversion regions is provided in [[the]] said nick region.

Claim 8. (Currently Amended) A photoelectric conversion device according to claim 5, wherein [[the]] said buried isolation region is not placed in an area below [[the]] said one main electrode region of [[the]] each field effect transistor, at least, a part of the area.

Claim 9. (Currently Amended) A photoelectric conversion device according to claim 1,

wherein [[the]] said potential barrier region includes at least a semiconductor region whose conductivity type is opposite to the conductivity type of [[the]] said photoelectric conversion regions, and

wherein a buried region that is doped with an impurity of the same conductivity type as [[the]] said semiconductor region in a concentration lower than the impurity concentration of [[the]] said semiconductor region is placed in [[the]] said nick region.

Claim 10. (Original) A photoelectric conversion device according to claim 4, wherein the low impurity concentration region is one of a semiconductor substrate, an epitaxial layer, and a well.

Claim 11. (Currently Amended) A photoelectric conversion device according to

claim 1, wherein [[the]] said one main electrode region is connected to a fixed electric potential or a similar electric potential.

Claim 12. (Currently Amended) A photoelectric conversion device according to claim 1, wherein a semiconductor region whose conductivity type is opposite to the conductivity type of [[the]] said photoelectric conversion regions is placed below [[the]] said photoelectric conversion regions.

Claim 13. (Currently Amended) An image pick-up system, comprising:

- a photoelectric conversion device according to claim 1;
- an optical system for forming an image in [[the]] said photoelectric conversion device; and
- a signal processing circuit for processing a signal outputted from [[the]] said photoelectric conversion device.

Claim 14. (New) A photoelectric conversion device comprising:

- a plurality of photoelectric conversion regions each having a first semiconductor region for accumulating electric charges that correspond to incident light; and
- a plurality of amplifying field effect transistors into which a signal charge from the photoelectric conversion regions is inputted; and
- a second semiconductor region connected to a gate of each amplifying field effect transistor wherein:

a potential barrier region surrounds each photoelectric conversion region;

a low potential barrier region is formed in a part of said potential barrier region and has a potential lower than a potential of the other part of said potential barrier region;

a transfer region transfers the signal charges in each of the first semiconductor regions to the second semiconductor regions; and

one of main electrode regions of each field effect transistor is placed adjacent to said low potential barrier region, said main electrode region having the same conductivity type as said first semiconductor region.

Claim 15. (New) A photoelectric conversion device according to claim 14, wherein said potential barrier region includes at least a selectively oxidized film and a channel stopping layer directly below said selectively oxidized film.

Claim 16. (New) A photoelectric conversion device according to claim 14, wherein said potential barrier region includes at least a buried isolation region whose conductivity type is opposite to that of said photoelectric conversion regions.

Claim 17. (New) A photoelectric conversion device according to claim 14, wherein each photoelectric conversion region is formed in a low impurity concentration region that is doped with an impurity of the same conductivity type as said photoelectric conversion regions in a concentration lower than the impurity concentration of said photoelectric conversion regions.

Claim 18. (New) A photoelectric conversion device according to claim 17, wherein a buried isolation region whose conductivity type is opposite to the conductivity type of said photoelectric conversion regions is formed below each field effect transistor.

Claim 19. (New) A photoelectric conversion device according to claim 18, wherein said buried isolation region placed below each field effect transistor surrounds a region larger than each photoelectric conversion region, and wherein the region surrounded by the buried isolation region functions as a photosensitive region.

Claim 20. (New) A photoelectric conversion device according to claim 14, wherein an impurity diffusion region whose conductivity type is opposite to the conductivity type of said photoelectric conversion regions is provided in a nick region.

Claim 21. (New) A photoelectric conversion device according to claim 18, wherein said buried isolation region is not placed in an area below said one main electrode region of said field effect transistor, at least, a part of the area.

Claim 22. (New) A photoelectric conversion device according to claim 14, wherein said potential barrier region includes at least a semiconductor region whose conductivity type is opposite to the conductivity type of said photoelectric conversion regions, and

wherein a buried region that is doped with an impurity of the same conductivity type as said semiconductor region in a concentration lower than the impurity concentration of said semiconductor region is placed in a nick region.

Claim 23. (Original) A photoelectric conversion device according to claim 17, wherein the low impurity concentration region is one of a semiconductor substrate, an epitaxial layer, and a well.

Claim 24. (New) A photoelectric conversion device according to claim 14, wherein said one main electrode region is connected to a fixed electric potential or a similar electric potential.

Claim 25. (New) A photoelectric conversion device according to claim 14, wherein a semiconductor region whose conductivity type is opposite to the conductivity type of said photoelectric conversion regions is placed below said photoelectric conversion regions.

Claim 26. (New) An image pick-up system, comprising:

- a photoelectric conversion device according to claim 14;
- an optical system for forming an image in said photoelectric conversion device;

and

- a signal processing circuit for processing a signal outputted from said photoelectric conversion device.